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10/695,796

10/30/2003

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04/18/2006

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EXAMINER

WALFORD, NATALIE K

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|---------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/695,796 | Applicant(s) TORII ET AL. | |
| | Examiner Natalie K. Walford | Art Unit 2879 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The Amendment, filed on February 13, 2006, has been entered and acknowledged by the Examiner.

Claims 1-11 are pending in the instant application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-9, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsutani (US PUB 2001/0005109).

Regarding claim 1, Matsutani discloses a method for manufacturing a spark plug in figure 1 and 2, which includes a tubular metallic shell (item 5), a tubular insulator (item 4) extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode (item 1) extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator and with a rear end of the center electrode fixed in the insulator, and a ground electrode (item 3) with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground

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electrode and the center electrode forming a discharge gap therebetween (FIGS. 1 and 2), and in which at least one of the center electrode and the ground electrode includes an electrode base metal (item 121) and a chip (item 12) provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material, the method including:

- (1) providing a chip including a flange portion (area surrounding item 121, 122, and 12) and a protrusion (item 122) protruding from a first face of the flange portion;
- (2) tentatively joining, through resistance welding, a second face of the flange portion opposite the protrusion to a joint face (item 121) of the electrode base metal of at least either one of the center electrode and the ground electrode, the joint face being located on a side toward the discharge gap (page 1, paragraph 10);
- and (3) laser-welding the flange portion to the joint face such that a weld portion (item 2) is formed between the electrode base metal and the chip to reach points on the second face of the flange portion, the points being located inward of corresponding intersections of the second face of the flange portion and imaginary extension lines of generatrices of a side surface of the protrusion (page 1, paragraph 10).

Regarding claim 2, Matsutani discloses the method for manufacturing a spark plug as claimed in claim 1, wherein the joint face is located on the electrode base metal of the ground electrode on a side toward the discharge gap (FIGS. 1 and 2).

Regarding claim 3, Matsutani discloses the method for manufacturing a spark plug as claimed in claim 2, wherein, when D represents a maximum distance between the intersections,

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the weld portion is present so as to extend to a distance D/5 or more inward of the intersections as measured on the second face (FIGS. 1 and 2 and page 3, paragraph 46).

Regarding claim 6, Matsutani discloses the method for manufacturing a spark plug as claimed in claim 1, which includes locating the joint face on the electrode base metal of the ground electrode on a side toward the discharge gap, and welding the chip to the ground electrode while the ground electrode is bent away from the distal end of the center electrode (FIG. 1).

Regarding claim 7, Matsutani discloses a spark plug in figures 1 and 2, including a tubular metallic shell (item 5), a tubular insulator (item 4) extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode (item 1) extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator and with a rear end of the center electrode fixed in the insulator, and a ground electrode (item 3) with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground electrode and the center electrode forming a discharge gap therebetween, at least one of the center electrode and the ground electrode including an electrode base metal (item 121) and a chip (item 12) provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material, wherein the chip includes a first end having a flange portion (area surrounding item 121, 122, and 12) and a protrusion (item 122) at a second end protruding from a first face of the flange portion; a second face of the flange portion opposite the protrusion is tentatively joined, through resistance welding (page 1, paragraph 10), to a joint face (item 121)

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of the electrode base metal of at least either one of the center electrode and the ground electrode, the joint face being located on a side toward the discharge gap; and the flange portion is laser-welded to the joint face such that a weld portion (item 2) is formed between the electrode base metal and the chip to reach points on the second face of the flange portion, a part of the weld portion inwardly extending between the electrode base metal and the first end of the chip (FIG. 2), the points being located inward of corresponding intersections of the second face of the flange portion and imaginary extension lines of generatrices of a side surface of the protrusion.

Regarding claim 8, Matsutani discloses the spark plug as claimed in claim 7, wherein the weld portion contains components of the chip in an amount in the range of from 20% by mass to 80% by mass (page 3, paragraph 46 and page 4, paragraph 54).

Regarding claim 9, Matsutani discloses the spark plug as claimed in claim 8, wherein the weld portion contains components of the chip in an amount in the range of from 30% by mass to 60% by mass (page 3, paragraph 46 and page 4, paragraph 54).

Regarding claim 11, Matsutani discloses the spark plug as claimed in claim 7, wherein a part of the weld portion extends inwardly and below corresponding intersections of the second face of the flange portion and imaginary extension lines of the side surface of the protrusion (FIG. 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsutani (US PUB 2001/0005109) in view of Takamura et al. (US 4,581,558).

Regarding claim 4, Matsutani discloses the method for manufacturing a spark plug as claimed in claim 1, but does not expressly disclose which includes providing in step (1) a plate-like intermediate member having at least one of a melting point and linear expansion coefficient falling between that of the electrode base metal and that of the chip, and having a face larger than the second face of the flange portion; and in step, (2), providing the intermediate member between the joint face and the chip, as claimed by Applicant. Takamura is cited to show a spark plug with a plate-like intermediate member (FIG. 6, item 6) between a chip and electrode base metal of a spark plug, having a thermal expansion different than the chip and electrode base metal (column 3, lines 2-6). Takamura teaches that having an intermediate layer, it is possible to reduce thermal stress applied the chip due to the differences in the thermal expansion and to avoid rupture of the chip, thereby providing a longer service life of the spark plug (column 3, lines 18-25). The Examiner notes that Takamura does not disclose that the plate-like intermediate member has a larger face than that of the flange portion, but it would have been obvious to one having ordinary skill in the art at the time of invention to have the face larger, since such a modification would have involved a mere change in the size of the component. A change in size is generally recognized as being within the level of ordinary skill in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Matsutani's method to include a plate-like intermediate

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member having at least one of a melting point and linear expansion coefficient falling between that of the electrode base metal and that of the chip, and having a face larger than the second face of the flange portion; and in step, and providing the intermediate member between the joint face and the chip as suggested by Takamura for providing an overall longer service life of the spark plug.

Regarding claim 5, the combined reference of Matsutani and Takamura disclose the method for manufacturing a spark plug as claimed in claim 4, which includes, in step (2), after the intermediate member is tentatively joined to the joint face through resistance welding (column 1, lines 38-45), tentatively joining the second face of the flange portion to the intermediate member through resistance welding (column 1, lines 38-45 and FIG. 6).

Regarding claim 10, Matsutani discloses the spark plug as claimed in claim 7, but does not expressly disclose further including an intermediate member having at least of a melting point and a linear expansion coefficient falling between that of the electrode base metal and that of the chip arranged between the joint face and the first end of the chip, as claimed by Applicant. Takamura is cited to show a spark plug with a plate-like intermediate member (FIG. 6, item 6) between a chip and electrode base metal of a spark plug, having a thermal expansion different than the chip and electrode base metal (column 3, lines 2-6). Takamura teaches that having an intermediate layer, it is possible to reduce thermal stress applied the chip due to the differences in the thermal expansion and to avoid rupture of the chip, thereby providing a longer service life of the spark plug (column 3, lines 18-25).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Matsutani's method to include a plate-like intermediate

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member having at least one of a melting point and linear expansion coefficient falling between that of the electrode base metal and that of the chip, and having a face larger than the second face of the flange portion; and in step, and providing the intermediate member between the joint face and the chip as suggested by Takamura for providing an overall longer service life of the spark plug.

Response to Arguments

Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalie K. Walford whose telephone number is (571)-272-6012. The examiner can normally be reached on Monday-Friday, 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

nkW

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